

PHYSICAL IMAGE QUALITY COMPARISON OF FOUR TYPES OF DIGITAL DETECTORS FOR CHEST RADIOLOGY

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To compare exposure requirements for similar image quality with two computed radiography (CR) systems (needle-based and conventional storage phosphor) and two flat-panel (DR) systems from different manufacturers for chest radiology (cesium iodide scintillator – amorphous silicon).

Image quality was assessed with a contrast-detail object (Artinis CD-RAD) inserted in 20 cm of PMMA to simulate clinical conditions. Series of images for seven different exposure levels were obtained at two tube voltages (102 and 125 kVp). A specific image evaluation software was used to determine the contrast of 15 circular holes with diameters ranging from 0.3 to 8.0 mm. Additionally, an observer-based method was applied to validate the results obtained with the software. Phantom and detector surface air kerma were measured for all images.

Image quality differences between systems were statistically significant when using the analyser software and were in good agreement with the observer performance. On average, the structured phosphor system required 55 % less phantom entrance air kerma than the conventional phosphor plate for the same image quality. Differences in exposure requirements were smaller for 125 kVp.

Structured CR provides improved low contrast detectability and a potential for dose reduction compared with conventional CR.

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